

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant : Takeshi Nishi, et al Art Unit : 2871
Serial No. : 10/735,885 Examiner : Huyen Le Ngo
Filed : December 16, 2003 Conf. No. : 4773
Title : A LIQUID CRYSTAL ELECTRO-OPTICAL DEVICE AND METHOD OF
DRIVING THE SAME

MAIL STOP AF

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

REPLY TO ACTION OF JUNE 10, 2008

Claims 11-28 are pending in this application, with claims 11-13 and 15 being independent.

Claims 11-12 and 25-28 have been rejected as being unpatentable over Ohe (U.S. Patent No. 6,011,606) in view of Ishii (U.S. Patent No. 5,566,010) and Yoshizo (JP 57-141478).

With respect to claims 11 and 12, applicant requests reconsideration and withdrawal of this rejection because nothing in Ohe, Ishii and Yoshizo would have resulted in one of ordinary skill in the art modifying Ohe's device to include Yoshizo's liquid crystal material. The rejection acknowledges that Ohe does not disclose a light modulating layer including a liquid crystal, an optically active substance, and a dichroic dye. The rejection then argues that one of ordinary skill in the art would have replaced Ohe's liquid crystal with that of Yoshizo in order to provide improved visibility and contrast, as taught by Yoshizo. However, Ohe already describes techniques for obtaining devices with improved contrast. See Ohe at col. 14, lines 45-46 and col. 15, lines 46-47. Accordingly, since there is nothing in either reference to imply that Yoshizo's liquid crystal would provide improvements over Ohe's, there would have been no reason, absent an impermissible hindsight reconstruction of the invention, to modify Ohe's device in the manner set forth in the rejection.

In addition, Ohe places special importance on the properties of the liquid crystal material, such as, for example, the resistivity of the liquid crystal material as discussed at col. 2, lines 26-28. By contrast, Yoshizo appears to be silent as to whether Yoshizo's liquid crystal material

includes the desired properties, such that a person seeking to maintain the desired properties of Ohe's device would not have been led to turn to the liquid crystal material of Yoshizo.

Also, Yoshizo contemplates using the liquid crystal material in a device that operates very differently from the device of Ohe. In particular, as shown in Fig. 1 of Yoshizo, Yoshizo's device operates by applying an electric field perpendicularly to the substrates, rather than in parallel to them. Accordingly, it is unclear from Yoshizo that the improved visibility and contrast touted by Yoshizo would even be applicable to a device that operates in the same manner as the device of Ohe.

Ishii also would not have led one of ordinary skill in the art to modify Ohe's device to include Yoshizo's liquid crystal material, and the rejection does not appear to indicate that Ishii would have done so. Applicant notes that, like Yoshizo, Ishii is directed to a device in which an electric field is provided between electrodes located on the different substrates (i.e., perpendicularly to the substrates), such that one of ordinary skill in the art would not have turned to Ishii to find improvements to the device of Ohe, which operates in a very different way. (See Ishii at, for example, col. 4, lines 44-48 and Fig. 7.)

With respect to claims 25-28, applicant requests reconsideration and withdrawal of this rejection because nothing in Ohe, Ishii and Yoshizo would have resulted in one of ordinary skill in the art modifying Ohe's device to remove the polarizers. The rejection appears to indicate that one of ordinary skill in the art would have removed Ohe's polarizers merely because Ishii describes a device that does not employ polarizers. However, as noted above, Ishii's device operates in a substantially different way than Ohe's. As such, nothing in Ishii would have provided any indication that operation of Ohe's device would have been improved, or would even have continued to operate as desired, if the polarizers were removed. Accordingly, there would have been no reason to modify Ohe to remove the polarizers just because Ishii describes a different type of device that doesn't include polarizers.

Claims 11-16 also have been rejected as being unpatentable over Sano (U.S. Patent No. 5,694,188) in view of Tomio (JP 57-117579), Wakita (U.S. Patent No. 5,574,593), Kobayashi (U.S. Patent No. 5,305,126) and Ishii. Applicant requests reconsideration and withdrawal of this rejection because no proper combination of Sano, Tomio, Wakita, Kobayashi and Ishii describes

or suggests an arrangement in which a cell thickness d between the pair of substrates is in a range of $1\mu\text{m} < d < 10\mu\text{m}$, as recited in each of the independent claims.

The rejection indicates that, at col. 5, lines 20-23,

“Sano discloses that the contrast becomes insufficient when cell gap less than $15\mu\text{m}$ if the guest-host without controlled dichroic dye and optical active substance when liquid crystal is applied low driving voltage. Thus in order to increase contrast, the guest-host must have controlled dichroic dye and optical active substance when cell gap is less than $15\mu\text{m}$ and applied low voltage.”

Applicant has reviewed Sano and has been unable to find, at col. 5, lines 20-23 or elsewhere, any disclosure by Sano that the guest-host must have “controlled dichroic dye and optical active substance” when a cell gap less than $15\mu\text{m}$ is used. Rather, that passage states:

“When the guest-host type liquid crystal is used, it is desirable that the height of the wall of the comb-shaped wall electrode, which corresponds to the cell gap, be 15 to $40\mu\text{m}$. If the height of the wall is less than $15\mu\text{m}$, the contrast ratio may become insufficient.

Thus, Sano explicitly teaches away from using a cell thickness in the range recited in the claims.

While Wakita indicates, at col. 10, lines 56-57, that substrates are “attached to each other by means of a spherical spacer at an interval of $5\mu\text{m}$,” nothing in Wakita would have led one of ordinary skill in the art to ignore Sano’s strong preference for a gap of $15\mu\text{m}$ or more.

Similarly, while Kobayashi indicates, at col. 10, lines 34-36, that a cell gap of $10\mu\text{m}$ is used, nothing in Kobayashi would have led one of ordinary skill in the art to ignore Sano’s strong preference for a gap of $15\mu\text{m}$ or more.

Also, while Ishii indicates, at col. 11, lines 9-19, that a gap of $10\mu\text{m}$ or less is used, nothing in Ishii would have led one of ordinary skill in the art to ignore Sano’s strong preference for a gap of $15\mu\text{m}$ or more. The fact that Ishii, as discussed above, describes a device that operates using electric fields that are perpendicular to the substrates rather than parallel to them, offers an additional reason that one of ordinary skill in the art would not have ignored Sano’s strong preference in favor of Ishii’s gap.

Finally, Tomio, which is cited as showing the mixing of an optical active substance in a guest-host liquid crystal, does not remedy the failure of the other references.

Accordingly, for at least these reasons, the rejection should be withdrawn.

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Claims 17, 18, 21 and 22, which depend from claims 11 and 12, have been rejected as being unpatentable over Ohe in view of Ishii, Yoshizo and Ohnishi (U.S. Patent No. 5,730,899). Applicant requests reconsideration and withdrawal of this rejection because Ohnishi does not remedy the failure of Ohe, Ishii and Yoshizo to describe or suggest the subject matter of claims 11 and 12.


Claims 17-24 have been rejected as being unpatentable over Sano in view of Tomio, Wakita, Kobayashi, Ishii and Ohnishi. Applicant requests reconsideration and withdrawal of this rejection because Ohnishi does not remedy the failure of the other references to describe or suggest the subject matter of the independent claims.

Applicants submit that all claims are in condition for allowance.

The fee in the amount of \$130 in payment of the one-month extension fee is being paid concurrently herewith on the Electronic Filing system (EFS) by way of Deposit Account authorization. Please apply any other charges or credits to deposit account 06-1050.

Respectfully submitted,

Date: 10/10/08



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